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# router

Last modified: Friday, February 13, 2004

(n.) A device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect.

Routers use headers and forwarding tables to determine the best path for forwarding the packets, and they use protocols such as ICMP to communicate with each other and configure the best route between any two hosts.

Very little filtering of data is done through routers.

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Describes how routing works in the Internet, with specific information on physical address determination, selection of inter-network gateways and symbolic and numeric addresses.

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Yahoo!'s directory of routing technology.

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is attached to the drum, enabling the scan head to travel the length of the document. Reflected light from the document is concentrated on the scanner photocell, which generates an analog signal.

**Rotating Helical Aperture Scanner** Originated by a lamp when fed onto the platen, via a lens system, the document's image is focused, first through a fixed horizontal slot, then through a rotating spiral series, and finally onto a photocell to generate an analog electrical current.

**Rotational Mailboxes** Information only whose information is automatically changed on a time or usage sensitive basis.

**ROTFL** I'm "Rolling on the Floor, Laughing." Used in ROTL 1. Remote Office Test Line. Provides the originate automatic inter office trunk transmission under the automatic control of CAROT from a remote office. 2. A popular online abbreviation, shorthand for "Rolling on the Floor Laughing"; an appropriate typed response, particularly amusing online remark. Other common acronyms include IMHO ("In My Humble Opinion") and SHO ("In My Not-So-Humble opinion").

**Rotor** The rotating part of a motor or other machines.

**ROTS** Rotary Out-Trunk Switches.

**Round Cutter** These are used to cut cables. The cutters are curved so that there is a space between the cutters.

**Round Robin** This is a method of distributing calls to a bunch of people. This method selects them on the list following the agent that received the last call, also TOP DOWN and LONGEST AVAILABLE.

**Roundtrip Propagation Delay** Roundtrip propagation delay from a burst modem to a burst modem will be 470 milliseconds to 570 milliseconds (About half a second). See SATELLITE TRANSMISSION DELAY.

**Routeable Protocols** Protocols, such as TCP/IP, and XNS, that support Network Layer addressing. Protocols constructed using these protocols contain information about data should move through a network. This information is in the NLA (Network Layer Address) field of the packet, by internetworking devices to make routing decisions.

**Route** The path that a message takes. In telephone networks, a route is the particular trunk group or inter-trunk groups between two reference points used to establish a path for a call. This term (or the term routing) is also used as a verb to define the act of selecting a route or routes.

**Route 66** A colloquial term for the Internet, with its interesting everywhere along the way. Route 66 used to be the way we drove across America before they put in highways.

**Route Advance** This feature routes outgoing calls to the nearest long distance lines when the first choice trunk is busy. The phone user selects the first choice route by dialing the corresponding access code. The phone equipment automatically advances to alternate trunks and trunk groups when the user's class of service. Route advance is a more sophisticated form of least cost routing. See LEAST COST ROUTING.

**Route Daemon** A program that runs under UNIX systems (and derived operating systems) to manage routes among machines in a local area network. Pronounced "route-dee."

**Route Discovery** Process through which a router learns LAN topology by passing information about the LANs it connects and receiving the same from other routers.

on others.

**Route Indicator** An address or group of characters in the header of a message defining the final circuit or terminal to which the message is to be delivered.

**Route List** A sequence of trunk groups that can be selected for a particular route. This list is comprised of trunk group and configuration attributes (e.g. Class of Service) defining the use of a particular trunk group.

**Route Mile** Let's say that you have two sheaths of fiber, each of which contains ten fibers and runs for one mile. That's two route miles (total distance of all fibers), two sheath miles (two sheaths running one mile), and twenty fiber miles (20 fibers running one mile).

**Route Optimization** Another way of saying Least Cost Routing.

**Route Server** An ATM term. A physical device that runs more network layer routing protocols, and which uses a query protocol in order to provide network layer routing forwarding descriptions to clients.

**Route Expander Card** A board manufactured by IBM for connection into a PC which provides the PC with a wide area interface to a frame relay network, including handling all of the necessary protocol encapsulation.

**Route Protocol** A protocol that can be routed by a router. So a router must understand the logical internetwork as defined by that routed protocol. Examples of routed protocols include DECnet, AppleTalk, and IP.

**Router 1:** As in software, router is a system level function that directs a call to an application.

**Router 2:** In hardware, routers are the central switching offices of the Internet and corporate Intranets and WANs. Routers are used by everybody — from backbone service providers to Internet Service Providers (ISPs), from corporations to universities. The main provider of routers in the world is Cisco. It has built its gigantic business on selling routers — from small ones, connecting a simple corporate LAN to the Internet, to corporate enterprise wide networks, to huge ones connecting the largest of the largest backbone service providers. A router is, in the strictest terms, an interface between two networks.

Routers are highly intelligent devices which connect like and unlike LANs (Local Area Networks). They connect to MANs (Metropolitan Area Networks) and WANs (Wide Area Networks), such as X.25, Frame Relay and ATM. Routers are protocol-sensitive, typically supporting multiple protocols. Routers most commonly operate at the bottom 3 layers of the OSI model, using the Physical, Link and Network Layers to provide addressing and switching. Routers also may operate at Layer 4, the Transport Layer, in order to ensure end-to-end reliability of data transfer.

Routers are much more capable devices than are bridges, which operate primarily at Layer 1, and switches, which operate primarily at Layer 2. Routers send their traffic based on a higher level of intelligence inside themselves. This intelligence enables them to consider the network as a whole. How they do this (also called routing considerations) might include destination address, packet priority level, least-cost route, minimum route delay, minimum route distance, route congestion and community of interest. Routers are unique in their ability to consider an enterprise network as comprising multiple physical and logical subnets (subnetworks). Thereby, they are quite capable of confining data traffic within a subnet, on the basis of privilege as defined in a policy-based routing scheme. In a traditional router topology, each router port defines

a physical subnet, and each subnet is a broadcast domain. Within that domain, all connected devices share broadcast traffic; devices outside of that domain can neither see that traffic, nor can they respond to it. Contemporary routers have the ability to define subnets on a logical basis, based on logical address (e.g., MAC or IP address) information contained within the packet header, and acted upon through consultation with a programmed routing table. In addition to standalone routers developed specifically for that purpose, server-based routers can be implemented. Such routers are in the form of high-performance PCs with routing software. As software will perform less effectively and efficiently than firmware, such devices generally are considered to be less than desirable for large enterprise-wide application, although they do serve well in support of smaller remote offices and less-intensive applications. Routers also are self-learning, as they can communicate their existence and can learn of the existence of new routers, nodes and LAN segments. Routers constantly monitor the condition of the network, as a whole, in order to dynamically adapt to changes in network conditions.

Characteristics of routers can include:

- LAN Extension
- Store & Forward
- Support for Multiple Media
- Support for Multiple LAN Segments
- Support for Disparate LAN Protocols
- Filtering
- Encapsulation
- Accommodation of Various and Large Packet Sizes
- High-Speed Internal Buses (1+ Gbps)
- Self-Learning
- Routing Based on Multiple Factors
- Route Length
- Number of Hops
- Route Congestion
- Traffic Type
- Support for a Community of Interest (VLAN)
- Redundancy
- Network Management via SNMP

Router protocols include both bridging and routing protocols, as they perform both functions. Those protocols fall into 3 categories:

1. Gateway Protocols establish router-to-router connections between like routers. The gateway protocol passes routing information and keep alive packets during periods of idleness.
2. Serial Line Protocols provide for communications over serial or dial-up links connecting unlike routers. Examples include HDLC, SLIP (Serial Line Interface Protocol) and PPP (Point-to-Point Protocol).
3. Protocol Stack Routing and Bridging Protocols advise the router as to which packets should be routed and which should be bridged.

This definition courtesy of "Communications Systems & Networks," the best-selling book by Ray Horak, my Contributing Editor. To buy the book, [www.amazon.com](http://www.amazon.com). See also Bridges, Hubs, Internetworking and Switches.

**Router-Based Firewall** A router-based firewall is a packet-filtering router. Not everyone agrees that a packet-filtering router alone is a firewall. Many people insist that only a system that includes a dual-homed gateway is a firewall. However, other people argue that a packet-filtering router is a firewall because the router meets important firewall criteria: The router is a computer through which incoming and outgoing packets must pass through which only authorized packets